THE INHIBITION OF NF-κB ACTIVITY AND PROSTATE TUMOR CELL GROWTH BY AQUEOUS VERNONIA AMYGDALINA EXTRACTS

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Abstract: Cancer of the prostate (CP) the second leading cause of cancer-related deaths in American men. According to the American Cancer Society (ACS), about 186,320 new cases of CP will be diagnosed in 2008. Of these new cases, an estimated 30,870 cases are expected to occur in African American men. An estimated 28,660 will die in 2008 of result of CP. Cancer is one of many diseases that emanate from defects in signal transduction pathways leading to the alteration in genetic materials. Although the exact causes of CP are unknown, several factors contribute to the development of the disease, i.e. age, race, nationality, family history, diet and exercise. Choices of treatment vary with type and severity of the CP. Several procedures are used to treat CP including surgery, radiation therapy, and chemotherapy. Most forms of chemotherapy target all rapidly dividing cells and are not specific for cancer cells, therefore increasing the risks for developing side effects. Paclitaxel or Taxol (TAX) is one of the most common drugs used to treat CP. The side effects of TAX include, but not limited to, lowered resistance of infection, anemia, bruising or bleeding, tiredness and feeling weak, and diarrhea. The latter statement underscores the urgent needs for the discovery and development of novel anti-cancer and/or adjuvant agents to ameliorate the unwanted side effects of these chemotherapies. Plant-derived agents represent excellent sources for such novel and patient-friendlier anti-cancer and/or adjuvant agents. There is increasing evidence to show that Vernonia amygdalina (VA) may be one candidate for such agents. We hypothesized that VA will, alone and in combination with TAX, inhibit cell growth by altering the expression of pro-cancer and/or oncogenes molecules NF-κB, c-myc, and c-erb B2/neu in PC-3 cell lines. The PC-3 cells were propagated in tissue culture plates with DMEM supplemented with 10% FBS and 1% penicillin-streptomycin at 37°C in a 95% air/5% CO₂ humidified incubator. Cell growth was determined by ³H-thymidine incorporation assays and confirmed by cell counts using a hemacytometer. Treatment of cells with increasing concentrations of VA extracts (10, 100, and 1000 µg/ml) inhibited DNA Synthesis by 5.3 %, 38 % (p<0.05), and 72 % (p<0.01) respectively. Neither 10 nor 100 µM of TAX had any significant effects on cell growth. Furthermore, Preliminary data suggests that VA inhibits NF-κB activity by 17%, 19% and 22% using increasing concentrations of 10, 100 and 1000 µg/ml respectively as determined by NF-κB Transbinding kit. These data extend our previous finding by uncovering a new mechanism mediated by VA to elicit it action on PC-3 cells.

Keywords: Paclitaxel-resistance, prostate carcinoma, Vernonia amygdalina, NF-κB activity

Acknowledgements: This research was supported in part by Research Centers in Minority Institutions (RCMI)/NIH grant # G122RR13459-07S1; National Center for Minority Health Disparities (NCMHD)/NIH grant # P20MD000534-01.